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MONTANA DNRC Conversation

A Newsletter of the Department of Natural Resources and Conservation • Director Bud Clinch
Winter 2004

— NEVADA CREEK DAM REHABILITATION —

DNRC file photo by Ron DeWitt, HKM

New spillway for Nevada Creek Dam

This article is adapted from "Nevada Creek Dam Rehabilitation Phase II Nearing Completion," by Jim Domino, which appeared in the Winter 2004 issue of Water Lines, *a newsletter of DNRC's Water Resources Division.*

The final phase of the Nevada Creek Dam Rehabilitation Project is nearing completion.

Nevada Creek Dam is located in Powell County, approximately 9 miles southeast of Helmville and adjacent to Highway 141. The 88-foot-high dam is owned by the state and managed by DNRC's State Water Projects Bureau. The Nevada Creek Water Users Association operates the dam. The reservoir has a storage capacity of 11,152 acre-feet at the spillway crest and is used primarily for agricultural irrigation. The reservoir is also used for limited water-based recreation, primarily fishing. The dam is classified as high hazard under the Montana Dam Safety Act guidelines, which means that dam failure could result in loss of life.

Constructed in 1938 by the State Water Conservation Board, the dam is a compacted earth-filled structure with an upstream cutoff trench located on Nevada Creek, which is a tributary to the Blackfoot River. The dam has a concrete spillway chute on the left abutment. The controlled low-level outlet consists of a 60-inch reinforced concrete arch conduit controlled by a 54-inch butterfly valve.

Nevada Creek . . . *continued on page 3*

"To help ensure Montana's land and water resources provide benefits for present and future generations"

Nevada Creek . . . *continued from page 1*

In a study conducted in 1981, the U.S. Army Corps of Engineers (COE) found that the dam has inadequate spillway capacity, with the spillway showing serious deterioration. In COE's 1981 inspection report, the dam was classified as unsafe and in need of repair.

In 1981, the upper two-thirds of the spillway was overlaid with 1.5 inches of concrete. Another modification took place in 1990, when anchors were installed in the overlay section of the spillway to ensure that it would stay in place during high flows.

Nevada Creek Dam spillway

Phase I of the current rehabilitation began in 2002 with the extension of the outlet conduit and placement of a new terminal outlet structure. This phase also included a seepage collection system, dewatering wells, a toe berm, and material processing for the second phase.

The second phase consists of constructing a new primary spillway, adding fill to the dam crest to bring it up to design elevation, lowering part of the dike section, adding a flow restriction wall in the original spillway, and placing the excavated material from the primary spillway into the original spillway so that it can be used as an emergency spillway. This material in the original spillway will act like a fuse plug. All but one of the new spillway floor slabs have been poured, and the new walls are being placed. The stilling basin excavation is completed, and preparations are under way for the installation of riprap. The onset of cold weather necessitated the use of tents and blankets for temperature control and protection from the weather.

Completion of Phase II will bring the dam into full compliance with all current safety standards.

John Sanders serves as the project manager. John Sanders and Jim Beck have been sharing duties as the on-site DNRC representatives.

The total cost of the project is about $3 million. The Nevada Creek Water Users Association will pay approximately $500,000. The remaining funds are provided from various state sources including earnings from the Broadwater Hydropower Project, the DNRC Water Storage Account, and a Renewable Resource Grant from the Coal Severance Tax Trust Fund.

STATE LAUNCHES INITIATIVE TO REHABILITATE — THE ST. MARY FACILITIES —

This article was adapted from an article by the same title, by Paul Azevedo, which appeared in the Winter 2004 issue of Water Lines, *a newsletter of DNRC's Water Resources Division*

On Tuesday, November 18, approximately 230 water users, public officials, and concerned citizens from north central Montana attended a meeting in Havre convened by Lt. Governor Karl Ohs to discuss rehabilitation of the St. Mary Facilities of the Milk River Project. Often called the "Lifeline of the Hi-Line," the St. Mary Facilities control the trans-basin diversion of water from the St. Mary River to the North Fork of the Milk River. The purpose of the meeting was twofold: (1) to raise public awareness about the urgent need to rehabilitate the aging system, and (2) to begin to establish a process through which representatives from the State of Montana, federal government, Tribal governments, and Milk River basin water users can work on a comprehensive strategy to secure the needed congressional authorization and funding to rehabilitate the St. Mary Facilities.

Origin

Secretary of the Interior Ethan Allen Hitchcock authorized the Milk River Project on March 4, 1903, as one of the first irrigation projects initiated by the new Reclamation Service (now the U.S. Bureau of Reclamation) under the Reclamation Act of 1902. The objective for the project was to provide a stable source of water for irrigation of the lower Milk River valley. Early

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St. Mary Facilities . . *continued from page 2*

settlers had learned that natural flows in the Milk River did not provide a reliable water source for irrigation in the downstream end of the watershed. Consequently, a plan to divert water from the St. Mary River to augment flows in the Milk River was a key component of the Milk River Project. Settlers moved to the Milk River valley on the promise of a stable supply of water for irrigation.

Description of the System

Built, owned, and operated by the U.S. Bureau of Reclamation (USBR), the St. Mary Facilities consist of a storage dam (Sherburne Dam), diversion dam, head gate, 29 miles of canal, two sets of steel siphons, and five concrete drop structures. The system is located entirely on the Blackfeet Reservation in Glacier County.

The facilities begin at Sherburne Reservoir on the eastern edge of Glacier National Park. Water stored in Sherburne Reservoir is released to Swiftcurrent Creek and diverted to Lower St. Mary Lake via the Swiftcurrent Dike. From Lower St. Mary Lake, water flows into the St. Mary River and is diverted into the St. Mary Canal via the St. Mary Diversion Dam located 0.75 mile downstream. The canal follows the east side of the St. Mary River and crosses the river 9.5 miles below the diversion through two 90-inch, riveted steel-plate siphons 3,600 feet in length.

Photo by Mike Dailey

Outlet transition

Eight miles below the St. Mary crossing, a second set of riveted steel-plate siphons, 78 inches in diameter and 1,405 feet long, conveys the water across Hall's Coulee. A series of five concrete drops at the lower end of the 29-mile canal provide a total fall of 214 feet to the point where the water is discharged into the North Fork of the Milk River.

On the average, 150,000 acre-feet of water per year are transferred over the Hudson Bay/Gulf of Mexico divide to the North Fork of the Milk River. The water then flows for 216 miles through Alberta, Canada, before returning to Montana, where it is stored in Fresno Reservoir 14 miles west of Havre. Releases from Fresno Reservoir provide irrigation and municipal water along the Milk River to its mouth near Nashua, 200 miles to the east.

Photo by Mike Dailey

Leak in St Mary siphon as it crosses the St. Mary River in 2003

Problems

The St. Mary Facilities have been in operation for over 85 years with only minor repairs and improvements since the original construction. Most of the structures have exceeded their design life and are in need of major repairs or replacement. The capacity of the system has dropped from a design capacity of 850 cubic feet per second (cfs) to approximately 670 cfs. The steel siphons have slope stability problems and leaks, and the concrete in the drop structures is severely deteriorating. Landslides along the canal and the condition of the structures make the canal unreliable as a water source. Failure of one of the drop structures in 2002 resulted in the canal being turned off for approximately two months during the irrigation season.

The economy of the Hi-Line region has been built around the stable water supply provided by the St. Mary Facilities. Without the needed rehabilitation, the aging system might soon suffer catastrophic failure. Loss of the St. Mary Facilities would have a disastrous economic

St. Mary Facilities . . *continued on page 4*

St. Mary Facilities . . . *continued from page 3*

impact on the Milk River basin and the state of Montana in general.

Importance to the Milk River Basin

The St. Mary Facilities are the keystone to large-scale irrigated agriculture in the Milk River basin. The system provides water to irrigate over 110,000 acres on approximately 660 farms within USBR's Milk River Project. Together, these farms produce approximately 8.3 percent of all cattle and calves, 7.8 percent of all irrigated hay, and 8.2 percent of all irrigated alfalfa produced in Montana.

Although the St. Mary Facilities were originally built to provide irrigation water, the beneficiaries extend far beyond irrigated agriculture. The Milk River provides municipal water to approximately 14,000 people in the communities of Havre, Chinook, and Harlem. In addition, two rural water systems are supplied from Fresno Reservoir. Beneficiaries also include fisheries, recreation, tourism, water quality, and wildlife.

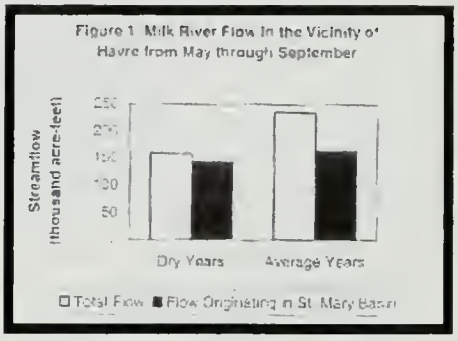
During irrigation season (May through September) in a year of normal flow, approximately 70 percent of the Milk River flow near Havre originates from the St. Mary River basin (Figure 1). In dry years, the imported water may make up 90 percent of the Milk River flow past Havre. During the drought of 2001, 95 percent of the available water in the Milk River at Havre originated in the St. Mary River basin!

Costs, Other Requirements

As authorized in 1903, the Milk River Project was a single-use irrigation project. At the time, irrigated agriculture was seen as the primary beneficiary of project construction. As a result, over the last 85 years, 100 percent of the cost to operate and maintain project infrastructure, including the St. Mary Facilities, has been borne by irrigators within the project through an annual assessment on their irrigated lands. However, according to USBR, ongoing costs of maintaining the aging system, including the St. Mary Facilities, exceed the irrigators' operation and maintenance payments. As a result, the St. Mary Facilities have deteriorated to the point that replacement and major rehabilitation are necessary. Since 1999, the State of Montana has awarded over $400,000 in grants, and the eight irrigation districts within the Milk River Project have contributed $200,000 for crucial repairs, merely to keep the system operating in some capacity.

According to an appraisal level study completed by USBR in 2003, it will cost approximately $90 million to rehabilitate the St. Mary Facilities back to the original design capacity of 850 cfs. USBR says that it does not have the money. According to reclamation law, a portion of the cost must be borne by the authorized beneficiaries of the water. In the case of the St. Mary Facilities, the cost would be borne primarily by the Milk River Project irrigators and to a lesser extent by the municipalities of Havre, Chinook, and Harlem.

Before any work could begin, a feasibility study on the project would have to be prepared. The feasibility study must include a final engineering report, National Environmental Policy Act (NEPA) compliance documentation, and a cultural resources survey.



Source: U.S. Bureau of Reclamation

Other Considerations

In addition to the huge monetary cost, rehabilitating the St. Mary Facilities would involve complex political and legal considerations. USBR studies indicate that the St. Mary diversion facilities are having a negative impact on bull trout (*Salvelinus confluentus*), which are listed as a threatened species. Rehabilitation of the system would involve two federal Indian reserved water rights compacts. The Fort Belknap Water Rights Compact is predicated on the continued viability of the St. Mary Facilities to deliver water to the Milk River basin. The compact is a delicate negotiated balance of water rights, including the Gros Ventre and Assiniboine Tribes' right to essentially all of the natural flow of the Milk River, subject to the claims of the Blackfeet Nation. The St. Mary Facilities are located on the Blackfeet Indian Reservation. The state and the Blackfeet Tribe are in negotiations for a water rights compact that will include claims for water from the St. Mary and Milk rivers. The Blackfeet Tribe must be consulted on any rehabilitation of the St. Mary Facilities. Also, Canadian and U.S. differences must be worked out over interpretation of the 1921 International Joint Commission Order on apportioning flows of the St. Mary and Milk rivers.

St. Mary Facilities . . . *continued on page 5*

St. Mary Facilities . . . continued from page 4

The Approach

At the November 18 meeting in Havre, representatives from DNRC unveiled a draft action plan for pursuing rehabilitation of the St. Mary Facilities. The state's approach is based on the belief that a partnership between basin water users (irrigation, municipal, business, recreation, fisheries, etc.), state government, Tribal government, and the federal government is the most promising course of action for pursuing rehabilitation of the system.

The state's proposed approach includes forming a St. Mary Rehabilitation Working Group charged with developing a workable solution for rehabilitating the aging system as soon as possible. The working group will be chaired by Lt. Governor Ohs and will be composed of local water users, concerned citizens, and state, Tribal, and federal officials with an interest in rehabilitating the system. Staffing and technical support will be provided by DNRC.

DNRC will also establish an Inter-Agency Rehabilitation Team to coordinate the efforts of the various state agencies that will be involved in the project.

In addition, DNRC is working with project stakeholders to seek legislation to secure congressional authorization and funding to prepare a feasibility study on rehabilitation of the system. Once the feasibility study is complete, legislation will be drafted to secure congressional authorization and funding to design and construct the preferred alternative for rehabilitating the system and address environmental requirements and mitigation.

In the effort to build a broad collaboration, Paul Azevedo with DNRC's Water Resources Division has been named state coordinator for the rehabilitation of the St. Mary Facilities. For additional information, contact Paul at the DNRC Water Management Bureau, P.O. Box 201601, Helena, MT 59620-1601, phone 406-444-6635, or e-mail pazevedo@state.mt.us.

Photo by Bill Gretman

St. Mary construction

DNRC AND AN AMAZING NEW TECHNOLOGY — HEATING SCHOOLS —

There's a new type of energy system and fuel for heating schools. It's clean and inexpensive, has a seemingly endless supply of fuel, and is easy to maintain. It can be built into a new building, or existing buildings can be retrofitted. And all this for only $250,000 to $750,000.

What is this amazing new system and fuel source?

Why, it's a wood-burning stove fueled by forest biomass, including logging slash and forest fuels that pose wildfire hazards, and the Department of Natural Resources and Conservation (DNRC) and a Montana senator are key players in the program.

Scattered across Montana are numerous older schools with old heating systems that are expensive to operate and maintain. Most are collections of systems — part gas; part electric, steam, or oil — that have been added as the school grew and the least expensive system of the day was installed. Add to that the continual increase in the price of the fuels (especially the onetime wonder, natural gas). Schools can pay $60,000 or more per year to maintain and operate these systems, straining lean operating budgets.

However, a 100,000-square-foot school can be heated with about 20 to 25 loads of wood chips per year, costing only about $17,000 per year.

Although purchasing these new systems is expensive, many schools, with the help of some grant dollars, will be able to make their payments, pay their heating costs, and have a bit left over.

Also, gasification biomass heating has been successfully used in New England and Canada for the past 20 years, and the technology of "wood-burning stoves" has advanced dramatically over this time. Modern gasification burners burn wood at over 1,800 degrees Fahrenheit and produce very little of the particulate and other by-products generally associated with wood heat. The only visible product exiting the "smoke stack" is water vapor.

Another piece to this story is the abundant supply of forest fuels available in the urban interface and adjacent area.

The final ingredient in this mix is the need to address forest health issues and/or reduce hazardous fuels. Roll this all up, and you have a program called Fuels for Schools, administered jointly by DNRC, the U.S. Forest Service (USFS), and Montana's Resource Conservation and Development (RC&D) areas.

Last summer USFS and the Bitterroot RC&D came to DNRC Forestry Division staff with an invitation to become a partner with them in the Fuels for Schools Program. They already had a demonstration project finalized, which began heating schools in Darby in December 2003. They also had economic analyses completed on schools in Seeley Lake, Victor, Philipsburg, Eureka, Thompson Falls, Superior, Polson, Libby, and Troy.

Photo by Rob Ethridge

Wood gasification burner and boiler installed in Darby

With the help of Congress and the efforts of Senator Conrad Burns, initial program financing was secured through a variety of federally funded biomass energy and forest wildfire fuel reduction programs.

The wood gasification burner and boiler installed to heat the three schools in Darby is shown in the photo. The burner is the black section on the bottom, and the boiler is the blue section on top. The wood heats the water, and the steam generated is pumped to the schools to provide the heat.

This program is a great opportunity for DNRC — fuel hazard reduction, economic support for schools, and warm students and teachers. DNRC service foresters will help schools understand the

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program, assist with feasibility studies on good candidate schools, and then provide construction assistance grant dollars (through a RC&D, preferably). We will also be there for general support as the schools work through the full process.

The U.S. Forest Service will continue to work to secure future funding from whatever federal, state, or private sources might be available. The RC&Ds enter into and administer the grant contracts with the selected schools. The schools contract for delivery of wood chips. The students learn about biomass heat in their science classes, do the measurements for wood moisture content, and provide explanations of the process to groups that tour the facility.

It is our expectation that, within five years, numerous schools will be heated with these systems. That's good for their budgets and creates a market for by-products of fuel reduction projects on adjacent forestlands. What a win/win situation for Montana!

Photo by Rob Ethridge

Forestry Division Administrator Bob Harrington (second from left) at the dedication ceremony for the Darby system

REGIONAL WATER SYSTEMS GO FORWARD

Upon their completion, four ventures now underway in Montana will have constructed and put in place enough water-main pipes to supply more than 70,000 Montanans with clean, safe drinking water, something that is not now a reality in dozens of communities.

That is the equivalent of more than 20,000 gallons of water per minute, all day, every day.

Several recent advances have occurred on all four of the systems. Following are the highlights.

Fort Peck (Dry Prairie) Regional Water System

Ground was broken in Culbertson on August 28 to begin construction on the first leg of a two-part (on-reservation and off-reservation) system in Daniels, Roosevelt, Sheridan, and Valley Counties. The construction consists of connecting to the existing Culbertson water treatment facility and laying 23 miles of pipe from the treatment facility northward toward Froid and then to Medicine Lake.

During this phase, the pipeline will be constructed from spring through early fall of 2004. The contract has been awarded to Carstensen Construction of Pipestone, Minnesota, which began laying pipe from the treatment facility at Culbertson northward the week of October 15, 2003. Currently 5 miles of 10-inch and 14-inch pipeline have been installed. "Completion of the required horizontal boring under the outlet of the Medicine Lake National Wildlife Refuge will likely take place in the autumn of 2004," said Regional Water Systems Coordinator Rick Duncan of DNRC's Conservation and Resource Development Division. "No construction activity is allowed from May through June due to waterfowl nesting patterns and other wildlife concerns, and the ground will still be too wet in July and August."

The Fort Peck Tribes and Dry Prairie Regional Water Authority (DPRWA) together received an additional $300,000 in federal Fiscal Year (FY) 2003 year-end funding, which was 10 percent of the total $3 million underfunded in April by the U.S. Bureau of Reclamation. The partial funding restoration was made possible through the efforts of Montana's Congressional delegation, mainly Senator Conrad Burns. The total estimated cost of the project is $220 million, as adjusted for inflation.

The funding package currently available from combined federal, state, and local funds totals approximately $4.6 million to cover the construction costs of this 23-mile portion of the Dry Prairie Project. A House-Senate conference committee recently approved a $7.5 million appropriation for the Fort Peck Dry Prairie system for FY 2004. Of that amount, approximately

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$2 million will be allocated to DPRWA for completion of the Culbertson–Medicine Lake segment.

The Fort Peck Tribes are proceeding with plans for construction of the water intake and water treatment plant on and near the Missouri River between Wolf Point and Poplar. The process of advertising for bids for construction of the water intake facility was completed during the autumn of 2003. That contract, in the amount of $3.5 million, has been awarded to GoPro Construction of Billings.

Due to the fact that the Tribes are allowed to carry over unexpended federal project funds from one fiscal year to the next, the $4.6 million tribal share of FY 2004 appropriations will be added to $4.3 million carried over from FY 2003. These federal funds will be used for construction of the water intake facility; design of the water treatment plant, including site work at the plant location near the intersection of U.S. Highway 2 and Montana Highway 13; and design of the main water pipeline for the segment from Poplar to Big Muddy Creek. The Big Muddy Creek's confluence with the Missouri River is the southeastern boundary of the Fort Peck Reservation.

In addition, some of the Tribes' FY 2004 appropriated funds have been designated for design and construction of a project administration facility.

Rocky Boy's/North Central Montana Regional Water System

Upon completion, this regional drinking water system will ensure that more than 18,000 residents of north central Montana, including residents of the Rocky Boy's Indian Reservation, will have daily access to over 18 million gallons of high quality drinking water. The water will be provided to communities, rural water districts, Hutterite colonies, and other rural users of Toole, Liberty, eastern Glacier, eastern Pondera, Hill, northern Chouteau, and northeastern Teton Counties.

The City of Cut Bank recently became an active partner in the North Central Montana Regional Water Authority (NCMRWA). At its 2003 annual meeting, the authority voted to make Cut Bank a member entity. "This is great news for Cut Bank and the authority, as they now have another community integrally involved. Regional water supply systems are based on an economy of scale. The more smaller member systems that become involved, the more cost-efficient the larger system can be," Duncan explained.

Approximately 450 miles of transmission pipeline will connect to existing water supply mains and distribution lines for communities and rural water districts throughout the area. The intake and water treatment facility are planned for a location at or near Tiber Dam on Lake Elwell in southwestern Liberty County. From the plant, a core transmission line will deliver water directly to the Rocky Boy's Indian Reservation, with non-core transmission lines branching off the core main line to all other areas to be served.

The initial draft of the final engineering report (FER) was completed by HKM Engineering, the project engineering firm, on September 25. The draft FER was distributed to the coordinating committee for the North Central Montana Water Authority, tribal officials, and state and federal agencies directly involved with the project, including the Department of Environmental Quality, Department of Natural Resources and Conservation, and U.S. Bureau of Reclamation. According to Duncan, these entities have reviewed the document and provided comments. HKM Engineering is now reviewing those comments and discussions as part of efforts to complete the FER.

"The FER will contain the general system technical overview along with design specifications on such items as water demands, water main networking, pump locations, pipe size, intake and water treatment technology specifications, etc. It's a blueprint for the system in both text and visual plan sheets," Duncan explained. "The reason so much attention is paid to this document is that it will become the basic plan for the whole system, and a guide for all further design, review, and construction activities through completion of all component phases."

The Rocky Boy's/North Central System has been approved by Congress for funding in FY 2004, and the bill was signed by President Bush in December. A total of $822,000 will be made available through the U.S. Bureau of Reclamation's budgeted funds and will combine with the non-federal match (state and local) for the current year's funding for the system. These funds will pay for completion of the FER and the environmental assessment (EA), as well as for design of the intake and pilot testing of the water treatment technology. The Chippewa Cree Tribe and NCMRWA will lobby Congress each year for funds for the coming year's construction schedule; the total funding requested for FY 2005 will exceed $15 million.

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Regional Water . . . *continued from page 8*

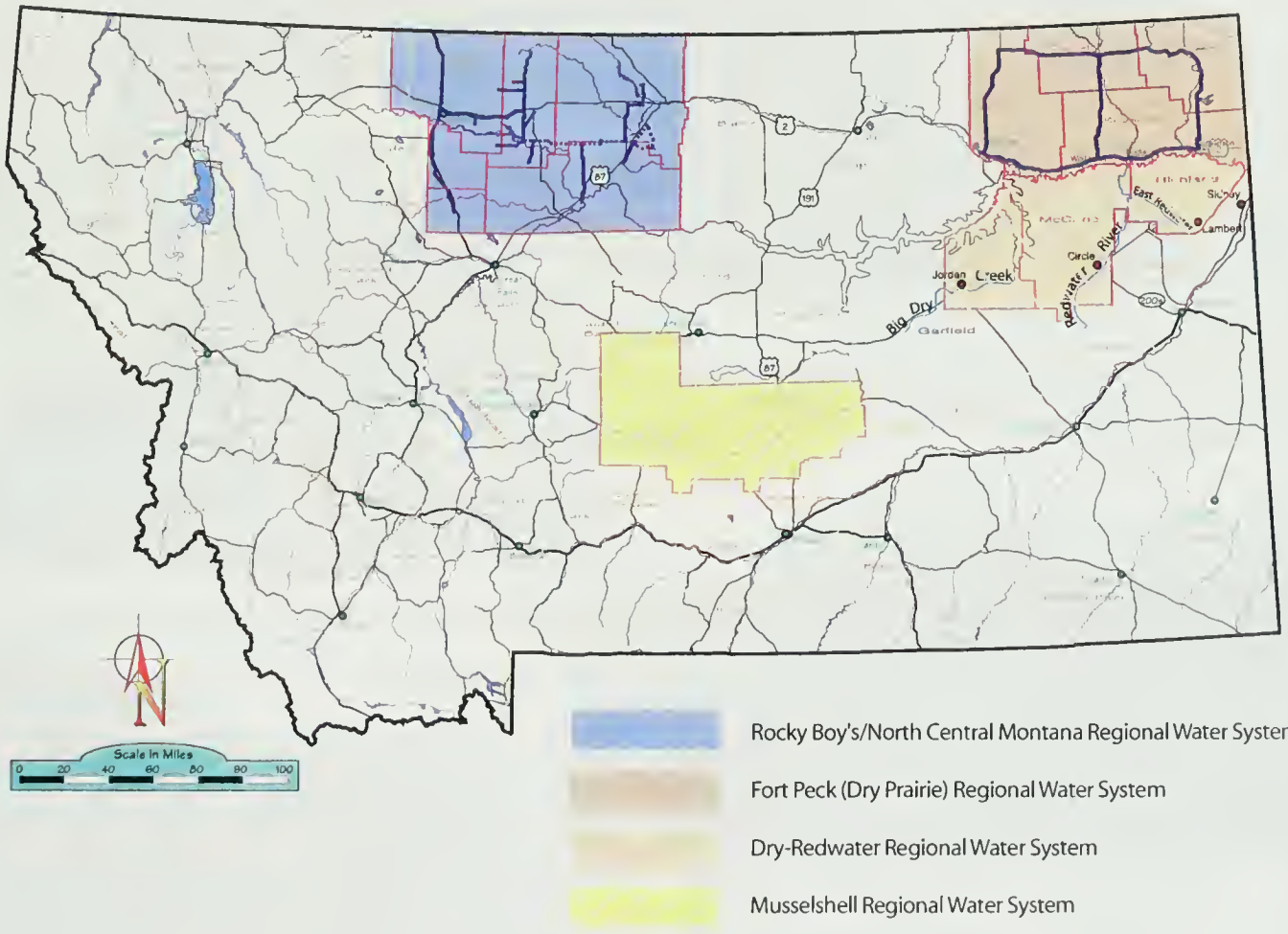
In addition to the FER, a water conservation plan has been completed. This plan outlines the conservation measures recommended under U.S. Environmental Protection Agency guidelines and approved by the Tribe and the authority. The measures will include a leak detection program, water metering, and public education programs. The plan is required by the U.S. Bureau of Reclamation and must be completed in order for the project to receive federal funding.

HKM Engineering and HDR Engineering are jointly drafting reports that are being compiled to address environmental concerns. The analyses are being completed in order to comply with the requirements of the National Environmental Policy Act and the Montana Environmental Policy Act.

These documents (FER, water conservation plan, and environmental reports) will be finalized and submitted together to the U.S. Bureau of Reclamation, which, when satisfied with the form and content, will forward the submittal to the federal Office of Management and Budget. "The project sponsors' timetable calls for that entire process to be completed and reviewed by early in 2005," Duncan stated.

A new website is up and running for the regional water system. Designed by a professional website designer, the address is www.northcentralmontanawater.org. Project documents and files will be available on an ongoing basis, with periodic updates as more documents are finalized and become generally available to the public.

REGIONAL WATER SYSTEMS



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Dry-Redwater Regional Water System

Currently, a feasibility study to investigate specific aspects of a regional water system to provide water service to approximately 5,000 residents of McCone, Dawson, Garfield, and Richland Counties is in the planning stages. The 2003 Montana Legislature authorized a $30,000 Treasure State Endowment Program Grant to fund the study. McCone Conservation District (CD) has been designated as the sponsoring agency for this study. DNRC has contracted with the CD for administration of the grant.

"The study will take into consideration the needs of areas within all four counties as well as alternatives for source of supply, pipeline routing, etc.," Duncan explained. "The reasons for looking into a regional system as a source of supply are the consistent lack of quality water in the area and the long-term effects of the drought conditions prevalent throughout the entire state over the last five years."

According to Duncan, a steering committee was formed at a September 19 meeting in Circle. "The committee is made up of citizens and representatives from various governmental entities, including natural resource agencies. These will be the people responsible for furthering the investigations and determining whether such a system is practical in this area." While McCone CD is administering the grant, the steering committee will be overseeing the entire process and future planning. The steering committee continues to meet on a regular basis to discuss a needs survey, as well as aspects of the proposed feasibility study. Also, currently under development are plans for community meetings, an informational flyer for public distribution, and a series of press releases.

Musselshell Regional Water System

Communities along the Musselshell River drainage have long had difficulty in obtaining reliable quality water sources. As the drought over the last five years complicated the water concerns, Central Montana RC&D, Musselshell County, and other interested parties in the region began work on developing a regional water system. Portions of Judith Basin, Wheatland, Fergus, Golden Valley, and Musselshell Counties could be included in this proposed system.

As the primary sponsor, Musselshell County was granted $375,000 from the State Coal Board for the purposes of drilling an exploratory test well and completing a feasibility study for the system. Further engineering studies, as well as the formation of a regional water authority, are planned if sufficient funds remain after test well construction and the feasibility study are completed.

Drilling of the test well began in early August on a portion of state school trust land near Utica. The contractor, Agri-Industries, Inc., is from North Dakota. Well construction has consisted of several phases. A larger diameter borehole was drilled, cemented, and encased to 840 feet, with a deeper, smaller diameter borehole being drilled below the 840-foot level. The depth of the test well was originally estimated to be approximately 2,300 feet. Currently, the borehole has reached a depth of 2,700 feet, without encountering the limestone of the Madison Formation. Additional study of the situation, including negotiations with the well driller, is presently under way to continue efforts to reach water. The drilling results are expected to provide solid information about the quantity and quality of the water available in the area. The Madison Formation is a geologically ancient limestone aquifer of vast extent. Information available through the U.S. Geological Survey indicates that there are several regions of Montana, Wyoming, and South Dakota that utilize the Madison Formation as a primary source of water.

Estimates vary about how much water will be required to supply the new system, but one figure suggests 1 to 2 cubic feet per second for domestic and related purposes.

"Like the other areas in Montana working towards establishing a regional water supply system, residents in this part of the state are looking for a reliable, safe source of drinking water," Duncan said. "It'll take work, but, if this pans out, it'll be well worth it."

Conclusion

"These systems are going to provide an improved quality of life for Montanans on many different levels and in a variety of ways," according to Duncan. "We're all working together for a brighter tomorrow and a better Montana."

Dry Prairie Regional Water System

Photos by Dave Nickoloff, Dry Prairie Regional Water Authority

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IN MEMORY

Bob Auer became chief of DNRC's Information Technology Bureau in 1996, and he served on the editorial board for *DNRConversation* since 2001. On January 12, 2004, he died at the age of 49. This issue is dedicated to Bob. He'll be missed . . .

Photo by Jayne Auer

Bob Auer